

离子选择性PVC膜电极中溶剂化作用的研究 I: 碱金属离子由水相到TBP溶剂相的标准迁移自由能

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摘要 电位法测量了碱金属离子由水相到TBP(磷酸三丁酯)-

CH₃-3OH混合溶剂相的标准迁移自由能ΔG⁰-t。研究了溶剂化作用同PVC膜对金属离子选择性的关系。碱金属离子的ΔG⁰-t随着TBP在混合溶剂中含量的增加而增大。ΔG⁰-t还随着离子半径的增大而增大,这同TBP-PVC膜对碱金属离子的选择性次序相一致;而与四苯硼酸盐-TBP-PVC膜对碱金属离子的选择性次序不完全相同。说明了TBP为溶剂的四苯硼酸盐膜对金属离子的选择性除了同溶剂化作用有关外,还同膜相和水相中离子的交换反应常数等因素相关。

关键词 磷酸三丁酯 离子选择电极 选择性 膜电极 相变 水相 聚合物膜 相互关系 金属离子 碱金属离子 电位法 溶剂化作用 四苯硼酸盐 迁移自由能 混合溶剂相

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Studies in ion solvation in ion-selective PVC membrane electrodes I: Standard free energy of transfer of the alkali metal ions from water to TBP solvent

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Abstract The potentiometry with alkali metal ion-response glass electrode has been used to obtain the standard molar free energies of transfer, DG⁰? of alkali metal chlorides from water to tri-Bu phosphate (TBP)-methanol mixtures at 25℃. The relationship between ion solvation and selectivity of PVC membranes for alkali metal ions has also been studied. As increase of contents of TBP in mixtures, DG⁰?of alkali metal ions increases, and DG⁰?rises also with increase of ion radii. This case is in agreement with sequence of selectivity of TBP-PVC membrane for alkali metal ions, but it is not in accord with sequence of selectivity of TBP-PVC membrane based on tetraphenylborate. The results shows that the selectivity of PVC membrane electrodes based on tetraphenylborate is affected by reaction constant of ion exchange between aqueous solution and membrane as well as other factors, besides ion solvation.

Key words PHOSPHORIC ACID TRIBUTYL ESTER ION SELECTIVE ELECTRODE SELECTIVITY MEMBRANE ELECTRODES PHASE TRANSFORMATION WATER PHASE POLYMER FILMS CORELATIONS METAL ION ALKALI METAL ION

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